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Gregory S. Pettitt

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EXAMINER

HUNG, YUBIN

ART UNIT

PAPER NUMBER

2625

DATE MAILED: 08/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,295

Applicant(s)

PETTITT, GREGORY S.

Examiner

Yubin Hung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The attempt to incorporate subject matter into this application by reference to US patent serial No. 09/561,160 (P. 18, lines 27) is improper because the application has been allowed and the corresponding patent number is U.S. 6,594,387.

Claim Objections

1. Claim 2 is objected to because of the following informalities:
 - Line 2: "represents." Consider change it to "includes"

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5, 12-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 5 recites the limitations "storing," "communicating" "adjusting" steps in lines 2, 4 and 6, respectively. There is insufficient information to determine whether the steps are performed in the processing units or the controller. (For examination purpose, hereinafter it will be interpreted that the steps are performed in the each of the processing units.)

5. Claim 12, and similarly claims 13-23, recites the limitation "each projector" in line 4. There is insufficient information to determine whether this refers to "A projector" in line 1 or one of "a set of projectors" in line 4.

In addition, "processor" in line 12 should have been "projector" (see P. 3, lines 10-12 of the specification)

(Note: For examination purpose, hereinafter "A projector for a tiled projection display system" in lines 1-2 of claims 12 and 19 will be interpreted as "A tiled projection display system," "The projector" in line 1 of claims 13-18 and 20-23 as "The tiled projection display system" and "processor" in line 12 as "projector.")

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Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and in view of Nagasaka (US 6,519,049).

8. Regarding claim 1, Oguchi discloses

- a multiple projectors of a tiled projection display system, each projector having a processing unit and the system having a main controller
[Fig. 1, numerals 2 (projectors), 5 (main controller), 8 (Processing unit); Col. 5, lines 38-56]
- calculating, at the main controller, color correction data for each projector and communicating each projector's color correction data from the main controller to that projector
- [Fig. 1, numeral 7; Col. 5, lines 60-65. Note that communicating the correction data to the projectors is inherent]
- calculating pixel values, using the processing system of each projector, on the basis of that projector's color correction data
[Fig. 1, numeral 8 (processing units); col. 7, lines 42-51. Note that]

Oguchi does not expressly disclose

- storing chromaticity data in the processing unit of each projector, representing at least the colors of images generated by that projector
- communicating each projector's chromaticity data to the main controller
- storing standard color gamut data at the main controller, representing a standard color gamut to which the projectors are to be matched

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- calculating color correction data *based on chromaticity data and on the standard color gamut data*

However, Nagasaka teaches storing color-correction source data (considered as “chromaticity data”) of the source system [Fig. 1, numerals 200, 272; Col. 14, lines 44-48]; communicating the data to another system (e.g., the main controller) [Fig. 1, numerals 260, 160; Fig. 3, numeral S110; Col. 18, lines 45-55]; storing color-correction destination data (considered as “standard color gamut data”) of the destination system (interpreted as the “controller”) [Fig. 1, numerals 100, 172; Col. 14, lines 48-52. Note that the color-correction data is a device profile, which depends on the device’s gamut]; and calculating color correction data based on chromaticity data and on the standard color gamut data [Fig. 3, numeral S112; Col. 19, lines 1-24. Note that the calculation of color correction data is inherent]

Oguchi and Nagasaka are combinable because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Oguchi with the teachings of Nagasaka by storing chromaticity data in each projector and a standard gamut data in the controller and using both set of data to calculate color correction data in the controller. The motivation would have been to be able to allow automated calculation of color correction data (because the controller can obtain chromaticity data from a projector connects directly, instead of having to have someone to enter it).

Therefore, it would have been obvious to combine Nagasaka with Oguchi to obtain the invention of claim 1.

9. Regarding claim 8, Oguchi further discloses

- the main controller is a processing system in data communication with each projector
[Fig. 1, numerals 2, 5, 8]

10. Claims 2, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1, 8 above, and further in view of Onuma et al. (US 5,287,173).

11. Regarding claim 2, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

The combined invention of Oguchi and Nagasaka does not expressly disclose

- the chromaticity data further represents luminance of images generated by the projector

However, Onuma teaches using luminance as (part of) chromaticity data [Fig. 1, numeral 1 (light source); Col. 3, lines 28-32; Fig. 2, steps S-3 and S-4; Col. 2, lines 34-60; Col. 4, lines 26-33]

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The combined invention of Oguchi and Nagasaka is combinable with Onuma because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Onuma by using luminance as (part of) the chromaticity data of the projectors . The motivation would have been to be able to allow the adjustment of the projected luminance so as to achieve a seamless tiled display.

Therefore, it would have been obvious to combine Nagasaka with Oguchi to obtain the invention of claim 2.

12. Regarding claim 5, it is rejected because per the analysis of claims 1 and 2 the chromaticity data (including luminance) is stored in the processing unit and communicated to the controller and that Onuma further teaches gain adjustment using the luminance data [Fig. 2, steps S-5 and S-6; Col. 2, lines 55-60; Col. 4, lines 33-41]

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13. Claims 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1, 8 above, and further in view of Morgan et al. (US 6,453,067).

14. Regarding claim 3, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

For the following limitations, while the combined invention of Oguchi and Nagasaka discloses the storing, communicating and calculating steps recited below, it does not expressly disclose that the data for calculating color correction being operated upon include relative luminance data:

- storing projector *relative luminance data* in the processing unit of each projector, representing the relative luminance of colors generated by that projector
- storing *standard relative luminance data* at the main controller, representing a standard relative luminance of colors to which the projectors are to be matched
- wherein the communicating step is performed by also communicating this *projector relative luminance data*; and the calculating step is performed such that the color correction data is further based on the *projector relative luminance data*

However, Morgan teaches the use of relative luminance for color correction

[Abstract: lines 1-11; Fig. 9, numerals 504, 906]

The combined invention of Oguchi and Nagasaka is combinable with Morgan because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Morgan by including relative luminance as (part of) the chromaticity data of the projectors for calculating color correction. The motivation would have been to be able to compensate for the addition of the white segment data, as recited in [Morgan: abstract, lines 8-11]..

Therefore, it would have been obvious to combine Morgan with Nagasaka and Oguchi to obtain the invention of claim 3.

15. Claim 4 is rejected because Morgan further teaches the use of a color wheel in a light projecting path [Fig. 9, numerals 504] and consequently the relative luminance data represents effective light times of each color.

16. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1 and 8 above, and further in view of Noguchi (US 6,101,272).

17. Regarding claim 6, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

The combined invention of Oguchi and Nagasaka does not expressly disclose

- the step of communicating each projector's chromaticity data is performed by communicating the data in the form of a transfer function matrix

However, Noguchi discloses performing gamut transformation and color correction (i.e., chromaticity data) using matrix operations [Col. 29, lines 39-44] and therefore teaches/suggests communicating the data in the form of a transfer function matrix.

The combined invention of Oguchi and Nagasaka is combinable with Noguchi because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Noguchi by communicating the chromaticity data in the form of a transfer function matrix. The motivation would have been to be because it is a compact form to represent the data and matrix operations can be easily implemented.

Therefore, it would have been obvious to combine Noguchi with Nagasaka and Oguchi to obtain the invention of claim 6.

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18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1 and 8 above, and further in view of Yoshikuni (JP 02-001351, with English abstract).

19. Regarding claim 7, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

The combined invention of Oguchi and Nagasaka does not expressly disclose

- the chromaticity data is calculated from primary and white color values

However, Yoshikuni teaches performing color correction on primary and white colors [English abstract: Constitution, lines 8-12]

The combined invention of Oguchi and Nagasaka is combinable with Yoshikuni because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Yoshikuni by calculating chromaticity data from primary and white colors. The motivation would have been to be because the input has been in R,

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G, and B (primary colors) and that correcting white color can extend the dynamic range of the output device when producing a color near white.

Therefore, it would have been obvious to combine Yoshikuni with Nagasaka and Oguchi to obtain the invention of claim 7.

20. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1, 8 above, and further in view of Appel (US 5,337,410).

21. Regarding claim 9, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

The combined invention of Oguchi and Nagasaka does not expressly disclose

- the main controller is also one of the projector processing units

However, Appel discloses a multi-processor system in which a processing unit also acts as a master (i.e., a controller) [Col. 2, lines 10-12].

The combined invention of Oguchi and Nagasaka is combinable with Appel because they have aspects that are from the same field of multi-processing.

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At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Appel by having one of the processing units act as the main controller. The motivation would have been to reduce the system cost.

Therefore, it would have been obvious to combine Appel with Oguchi and Nagasaka with to obtain the invention of claim 9

22. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1, 8 above, and further in view of Sato (US 6,467,910).

23. Regarding claim 10, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

The combined invention of Oguchi and Nagasaka does not expressly disclose

- each projector generates images using a spatial light modulator

However, Sato discloses a projector with a spatial light modulator, among other components. [Fig. 21, 5 (spatial light modulator)]

The combined invention of Oguchi and Nagasaka is combinable with Sato because they are from the same field of endeavor of image projection devices.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Sato by using projectors equipped with a light source, a color wheel, a spatial light modulator, and a projection lens. The motivation would have been to be able to split and modulate light into R,G,B images for display on the screen.

Therefore, it would have been obvious to combine Sato with Oguchi and Nagasaka with to obtain the invention of claim 10.

24. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and Nagasaka (US 6,519,049) as applied to claims 1, 8 above, and further in view of Gibson (US 5,253,043).

25. Regarding claim 11, the combined invention of Oguchi and Nagasaka discloses all the limitations of its parent, claim 1.

Oguchi and Nagasaka do not expressly teach/suggest deriving color correction data from both primary and secondary colors. However, this limitation is taught by Gibson [Fig. 1; numeral 51; Col. 7, lines 52-66].

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The combined invention of Oguchi and Sato is combinable with Gibson because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Nagasaka with the teachings of Gibson by deriving color correction from both primary and secondary color. The suggestion/motivation would have been to provide more accurate color correction so that better image can be obtained.

Therefore, it would have been obvious to combine Gibson with the combined invention of Oguchi and Sato to obtain the invention of claim 11.

26. Claims 12-13, 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976) and in view of Nagasaka (US 6,519,049) and Sato (US 6,467,910).

27. Regarding claim 12, Oguchi discloses

- a tiled projection display system having a main controller, comprising a set of projectors, each projector operable to generate a portion of an image
[Fig. 1, numerals 2 (projectors), 5 (main controller); Col. 5, lines 38-56]
- each projector further having a processing unit (for processing pixel values for image data to be delivered to the spatial light modulator)

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- [Fig. 1, numeral 8 (processing units); col. 7, lines 42-51]
- wherein each processing unit stores chromaticity data associated with that processor and wherein each processor is operable to deliver the chromaticity data to the main controller, to receive color correction data from the main controller, and to calculate pixel values based on the color correction data)
[Per the analysis of claim 1. Note that with suitable programming the processing unit, which is already capable of performing color conversion, is capable of performing all the recited functions such as data storing and I/O (to and from the main controller—see the connection between the processing units and the calibration unit in Fig. 1)]

Oguchi does not expressly disclose

- each projector having a light path along at least the following elements: a light source, a color wheel, a spatial light modulator, and a projection lens

However, Sato discloses a projector with a light source, a color wheel, a spatial light modulator, and a projection lens. [Fig. 21, numeral 2 (light source), 4 (color wheel), 5 (spatial light modulator), 6 (projection lens); Col. 1, line 30- Col. 2, line 2.]

Oguchi, Nagasaka and Sato are combinable because they are from the same field of endeavor of image projection devices.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Oguchi with the teachings of Nagasaka and Sato by using projectors equipped with a light source, a color wheel, a spatial light modulator, and a projection lens. The motivation would have been to be able to split and modulate light into R,G,B images for display on the screen.

Therefore, it would have been obvious to combine Nagasaka and Sato with Oguchi to obtain the invention of claim 12.

28. Regarding claim 19, Sato further teaches/suggests that each projector has two or more spatial light modulators [Col. 1, lines 21-29].

29. Regarding claims 13 and 20, Sato further teaches/suggests the use of a digital micro mirror device for a spatial filter [Col. 1, lines 12-23].

30. Claims 14, 17, 21, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976), Nagasaka (US 6,519,049) and Sato (US 6,467,910) as applied to claim 12-13 and 19-20 above, and further in view of Onuma et al. (US 5,287,173).

31. Regarding claim 14, and similarly claims 17, 21 and 22, the combined invention of Oguchi and Sato discloses all the limitations of its parent, claim 12.

The combined invention of Oguchi and Sato does not expressly disclose

- The chromaticity data represents both color and luminance of images generated by the spatial light modulator

However, Onuma teaches using luminance as (part of) chromaticity data [Fig. 9, numerals 504, 914, 906]. (Note: The combined invention of Oguchi and Sato

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teaches/suggests using color generated by the spatial light modulator as per the analysis of claim 12.)

The combined invention of Oguchi and Sato is combinable with Onuma because they both have aspects that are from the same field of endeavor of color correction.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Sato with the teachings of Onuma by using spatial light filtered color and luminance as (part of) the chromaticity data of the projectors . The motivation would have been to be able to produce better seamless tiled display.

Therefore, it would have been obvious to combine Sato with Oguchi to obtain the invention of claim 14.

32. Claims 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976), Nagasaka (US 6,519,049) and Sato (US 6,467,910) as applied to claim 12 above, and further in view of and Morgan et al. (US 6,453,067).

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33. Claim 15 is similarly analyzed and rejected as per the analysis of claim 3.

34. Claim 16 is rejected because Morgan further teaches the use of a color wheel in a light projecting path [Fig. 9, numerals 504] and consequently the relative luminance data represents effective light times of each color.

35. Claims 18, 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oguchi et al. (US 6,340,976), Nagasaka (US 6,519,049) and Sato (US 6,467,910) as applied to claims 12-13, 19-20 above, and further in view of Gibson (US 5,253,043).

36. Regarding claims 18, and similarly claim 23, the combined invention of Oguchi and Sato discloses all limitations of its parent, claim 12.

Oguchi and Sato do not expressly teach/suggest deriving color correction data from both primary and secondary colors. However, this limitation is taught by Gibson [Fig. 1; numeral 51; Col. 7, lines 52-66].

The combined invention of Oguchi and Sato is combinable with Gibson because they both have aspects that are from the same field of endeavor of color correction.

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At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Oguchi and Sato with the teachings of Gibson by deriving color correction from both primary and secondary color. The suggestion/motivation would have been to provide more accurate color correction so that better image can be obtained.

Therefore, it would have been obvious to combine Gibson with the combined invention of Oguchi and Sato to obtain the invention of claim 18.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (703) 305-1896. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Yubin Hung
Patent Examiner
July 30, 2004



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